

NEWSLETTER

August 2007

Former branch chair bids farewell

As I prepare to hand over the chair of the Institute of Physics in Scotland committee to Prof. Julian Jones of Heriot-Watt University, I pause to reflect on some developments that have taken place during the last year.

One of the major highlights was the formation of an Education Committee for Scotland with terms of reference and membership agreed by IOP Council. The Curriculum for Excellence website states: "Scotland is currently pursuing its biggest education reform programme for a generation under the Scottish Executive's Ambitious, Excellent Schools agenda. The Curriculum for Excellence is central to this reform agenda. At its heart, it is the programme of work that is reviewing the current curriculum. It aims to provide more freedom for teachers, greater choice and opportunity for pupils and a single coherent curriculum for all young people aged 3–18."

It is important that the Institute is well informed about Scottish developments in education to enable it to take a proactive role when appropriate. The Education Committee for Scotland is chaired by Prof. Julian Jones, who will report on developments in Scotland to the IOP Education Board.

Our national officer, Alison McLure, has been largely responsible for raising awareness within the Scottish Executive of the Institute's objective to promote a Young Scientist Exhibition in Scotland, along the lines of the hugely successful Irish exhibition. The BT Young Scientist and Technology Exhibition 2007 broke all previous records, with 1278 projects entered,

representing more than 3024 students from across Ireland. Entries have increased steadily every year for the past six years from 669 in 2001 to the record number in 2007. The aim of the BT Young Scientist and Technology Exhibition is to attract more young people to science by making it more exciting, more accessible and something that can be fun, and to encourage them to take part in the competition.

The Science and Technology Matters team of Careers Scotland visited Dublin in January 2007 to see the exhibition first hand. The team has been set up to address the serious decline in people going into science and technology by supporting and reinforcing the national science and technology programmes, and developing additional resources to fill observed gaps in the provision for pupils, teachers, parents and the public. They will also set up a steering group, which will be tasked with coordinating outreach activity. They are hoping that Young Scientist will be a centrepiece activity of this group. Current expectations are that the Scottish Exhibition will be launched during 2008.

The Scottish Universities Physics Alliance (SUPA), established in November 2004, is now seeking a second round of funding. For the first time, SUPA will include physics colleagues from the universities of Aberdeen and Dundee, in addition to the original six partners from the universities of Glasgow, Edinburgh, Heriot-Watt, Strathclyde, Paisley and St Andrews. A proposal, involving an investment of circa £50 million, will be submitted to the Scottish Funding Council within the next few weeks.

The substantial financial contribution to SUPA from the eight participating universities is testament to the standing of physics in Scottish higher education institutions. SUPA has been good news for Scottish academic physics. I refer you to the editorial in the 28 June issue of *Nature*. These are proving to be exciting times for physics research in Scotland.

At the September committee meeting, Michael McVey presented a report on the 32nd Stirling Physics Meeting, which was held in May 2006. The event attracted a record number of 275 attendees. The 33rd Stirling Physics Meeting was held in early June this year and, although the numbers attending were slightly down on the previous two years, the quality of the programme was undiminished. The morning session was, as usual, an equal mixture of physics and physics education, while the afternoon's lecture presented physics and its applications at the frontiers of knowledge. The education elements focused on the Curriculum for Excellence – both the latest developments and one school's attempt to implement its philosophy. Four of the five Higher and Advanced Higher Physics prizewinners, their parents and their teachers attended the meeting.

The Stirling Physics Meeting is the jewel in the crown of IOP Scotland activities and is the envy of other IOP branches. Our thanks again go to Michael McVey and his team for their enthusiasm and dedication, which result, year after year, in a very exciting meeting and one that is highly appreciated by physics teachers in Scotland. Heather Reid has decided to stand down from the organising

committee. The IOP Scotland committee again thanks Heather for her outstanding contributions to the success of the Stirling meeting.

Following on from the highly successful events held in 2006 to mark the 175th anniversary of the birth of James Clerk Maxwell, IOP Scotland is, in partnership with the University of Glasgow, supporting events to mark the 100th anniversary of the death of William Thomson, Lord Kelvin. In 1846, when he was only 22 years old, Thomson accepted the chair of natural philosophy at the University of Glasgow, which he filled for 53 years, attaining recognition as one of the greatest physicists of his time. The Kelvin stone in Glasgow's Victorian Necropolis cemetery is currently being restored. The Institute has made a contribution to the cost of restoration. An event will be held at the Necropolis on 17 December, the 100th anniversary of Kelvin's death, to mark the completion of the restoration.

In June 2006 the IOP Scotland committee decided not to offer the Paperclip Physics Competition in Scotland, after the uptake from schools had been disappointingly low. The Institute will now offer a new national competition, SciCast, which will be run in collaboration with Planet Science and the Engineering and Technology Board. Details of the new competition will reach schools soon. Dr Carol Trager-Cowan, an IOP Scotland committee member, will act as the contact with IOP headquarters for the organisation of the competition in Scotland.

One of the important roles of the committee is to support physics outreach events and,

during the last year, we have continued to support a diverse range of them. We welcome applications for grants for such activities. We have recently agreed a set of guidelines for outreach funding applications to give more transparency to the application process. These will

be posted on the IOP Scotland branch's website.

Our outreach representative, Dr Gillian Lang from the Glasgow Science Centre, has represented IOP Scotland at the first of a series of meetings at IOP headquarters to exchange ideas and share best practice in

relation to physics outreach.

Finally, IOP Scotland is very much aware of the need to engage with physics students, with schools, with Institute members working in all areas of employment and with those members who have retired from full-time employment. We are

receptive to suggestions about how we might improve our interactions with members so, if you have any ideas, do share them with us.

Robert Chapman Former chair of the Institute of Physics in Scotland Committee, robert.chapman@paisley.ac.uk



School kids have fun studying our variable weather

On 20 or 27 March 2007 at 11.30 a.m., primary schools in Scotland participated in the Weather Watch Challenge by measuring cloud cover and temperature, and uploading their observations to the dedicated website. The recorded observations have been plotted on a map, which can be viewed at weather-watch-scotland.com.

More than 100 primary schools took part in the project, covering 27 of the 32 local authority areas. The challenge was partly designed by the Institute's national officer for Scotland in partnership with Careers Scotland. It was an opportunity for primary school pupils to monitor changes in the weather and see what the weather was like all over Scotland on one particular day.

The event served as a gentle introduction to observational science and meteorology for school pupils. It is hoped that teachers will be able to build on this in the future. Links have been added to the website so that pupils and teachers can investigate the subjects of weather and climate further.

Alison McLure

Senior members socialise in style

The Lunchtime Rendezvous at the University of Glasgow on 23 January 2007 was particularly successful, with an attendance of 26 people – two more than the official capacity of the Melville Room and a further two cheques having to be returned due to oversubscription.

The lecture, entitled "The Runaway Universe" and given by Dr Martin Hendry of the Department of Physics and Astronomy, University of Glasgow, gave an overview of astronomical research past and present. Using a data projector he conveyed the excitement of current investigations.

Afterwards Dr Hendry provided the details of the website (www.astro.gla.ac.uk/users/martin/presentations/) for those who wish to pursue this subject.

Dr John McCormick, chairman of the Scottish Association for Public Transport, presented the lecture "Transport, energy and the environment from a physicist's perspective", giving a detailed analysis of the cost: benefit ratio of various forms of transport. One surprising result was the very high fuel cost per passenger associated with some island ferry services in Scotland.

The talks were followed by a tour of the chapel by Tommy Kane and a four-course seated lunch in the Melville Room.

A second Lunchtime Rendezvous, attended by 20 members and guests, was held at the Clubhouse in Edinburgh on 21 March 2007. The lecture entitled "Waves in war: the technology of enemy and allied radar in WW2", was given by Prof. John Roulston, industrial professor of electronics in the



The Edinburgh social (left to right): Steven Johre, John Brindley, Alison McLure, Janet Higinbotham and Dr John Higinbotham.

School of Engineering at the University of Edinburgh.

Using a data projector and high-quality speakers, Prof. Roulston gave an exciting and brilliantly illustrated description of radar development. Film clips showing some of the pioneers in radar development were particularly interesting. The crucial step by Randle and Boot of solving the instability problem of the multicavity magnetron was carefully explained.

John Brindley, director of membership at the Institute, then talked about "The role of members in elections and registrations". Of particular interest was the role that retired members can have as members of the various panels, such as the Fellowship Panel.

The talks were followed by an excellent four-course seated lunch in the Clubhouse.

Three Lunchtime Rendezvous for members and partners are being planned for 2008: at the Melville Room, Gilbert Scott

Building, University of Glasgow on Tuesday 22 January; at the Clubhouse, Daniel Stewart's and Melville College, Inverleith Playing Fields, 525 Ferry Road, Edinburgh on Wednesday 19 March; and, for the first time, at the Maritime Museum, Aberdeen in October.

More details, including the names of speakers, will be included in a later issue of this newsletter. Booking forms, menus and prices, will be available on our website (iop.org/activity/branches/Scotland/) and will be sent to senior members in the Aberdeen, Dundee, Edinburgh and Glasgow areas.

Suggestions are welcome for topics and speakers for the Lunchtime Rendezvous or other Seniors Group activities. Contact Dr John Higinbotham, Seniors Group Coordinator, The Institute of Physics in Scotland, 12 (1F2) Bruntsfield Gardens, Edinburgh EH10 4EA.

John Higinbotham john.higinbotham@physics.org

Check out our website at <http://scotland.iop.org>

Branch event: environmental talks, the AGM, RSS Discovery and dinner

The Institute of Physics in Scotland held a day of talks about environmental physics, followed by the AGM and dinner on 2 June 2007. The day was held at Discovery Point in Dundee. This was an excellent venue with an exhibition about Antarctica and Royal Research Ship *Discovery* to entertain those not so interested in environmental physics.

Prof. Arthur Cracknell, recently retired from the University of Dundee, started with a talk on fossil fuels, global warming and the threat to our way of life. He took us skillfully through the evidence behind climate change and the dangers that it presents to the current way we live our lives. Dr Mhairi Coyle of the Centre for Ecology and Hydrology provided more detail with her talk, entitled "Tropospheric ozone: pollutant and greenhouse gas".

Lunch was followed by another excellent presentation on the physics of marine remote sensing. Dr Alex Cunningham of the University of Strathclyde outlined the work that he is doing to monitor and model



Thirsty work: the branch organized a varied and stimulating event.

algal blooms. Dr Paul Williams of the IOP Environmental Physics Group finished off the environmental part of the day with a passionate lecture entitled "Climate change and the Gulf Stream". The discussion centred on the chances of the Gulf Stream slowing down and what effects this might have on the climate of the UK.

Those who didn't need to be involved in the branch AGM were invited to a special showing of the Magic Planet at Sensation, Dundee's Science Centre. In the meantime the AGM was efficiently dealt with so that everyone attending could enjoy a tour of *Discovery*.

The ship was built in Dundee

and was used by Capt. Scott on a remarkable Antarctic expedition from 1902 to 1904. The ship was built especially for research purposes and, as physicists, we were particularly interested in the experiments of the ship's physicist, Louis Bernacchi. His work included magnetic measurements, auroral observations and seismic recordings, and the results were published by the Royal Geographical Society.

We returned to dry land for a feast far better than that enjoyed by Scott's men on the ship. Thank you to the 50 or so people who attended the talks, AGM, dinner or a combination of these.

Alison McLure

Branch can offer funding for your physics projects

The Institute of Physics in Scotland actively encourages its members and others to communicate exciting aspects and applications of physics to a wide audience. Its grant scheme is designed to give financial support of up to £2000 to individuals and organisations that are running physics-based events and activities.

Examples of events that we've funded are highlighted in most branch newsletters. For example, the NASA evening at Glasgow Science Centre (p7) was part-funded by the branch.

The aim of the grant scheme is to encourage and support the development of projects that:

- raise public awareness of, and engagement with, contemporary physics;
- inspire and enthuse young people, especially those not previously interested in physics;
- develop individuals' communication skills;
- reach audiences beyond the classroom and workplace.

The committee has developed guidelines for these grants and encourages members to see if their ideas can attract our funding. Further details and an application form can be found on the IOP Scotland website (iop.org/activity/branches/Scotland/index.html) or obtained from Alison McLure. **Alison McLure** alison.mclure@iop.org

What is the SNP's plan for science?

The Scottish National Party won the election in May by the narrowest of margins. Clearly there will be constitutional ramifications from the result, but what is the future for science under the new administration?

The SNP manifesto 2007 mentioned science in a few contexts and promised to:

- provide new measures to support innovation and extend access to vocational skills;
- ensure no new nuclear power stations are built in Scotland;
- put science and technology (along with modern languages) at the heart of the curriculum;
- introduce a Scottish science baccalaureate (as well as a Scottish modern language baccalaureate);
- focus the skills agenda so that people of all ages have access to relevant, valued and quality-

assured training opportunities throughout their working lives;

- provide an additional £10 million for cutting-edge research;

- refocus the Enterprise network to provide a more streamlined service for the Scottish business community and support key industries, such as tourism.

These promises were before the election, so what has the SNP said that it will do now that it is governing the country? The SNP-led administration has already stated in Parliament that it doesn't want nuclear power stations in Scotland.

It has also said, in general terms, that it will support innovation, science and research, but it hasn't stated specifically how it will achieve this. That said, it intends

to develop a Scottish skills strategy, which will "outline our aims, ambitions and plans for making Scotland's skills base truly world class", as announced by Fiona Hyslop, the Cabinet Secretary for Education and Lifelong Learning.

The Institute will reply to that consultation when it is issued. Get in touch if you have any ideas about what should be in such a strategy.

There has been no talk, as yet, of its other manifesto promises, but these are early days and a comprehensive spending review is coming soon.

The Institute will keep an eye on what is happening and try to keep members informed. Let us know if you have any burning issues that you would like us to lobby on.

Alison McLure

Career tool helps you plan future

The Institute has launched a free online tool that allows you to identify your professional development needs and to plan and record new learning. You can also use it to plan your progress towards chartered status. It is supported by comprehensive help materials and information sheets (e.g. "choosing a quality training provider" and "Web 2.0 for professional development"). See members.iop.org for details. **Stephanie Richardson** stephanie.richardson@iop.org

Why should we remember Kelvin?

A large audience gathered in Glasgow University's newest lecture theatre – the Sir Charles Wilson Building – on 30 April to hear the gifted lecturer and historian of science, Prof. Andrzej Wroblewski, give his lecture “Lord Kelvin, a look across a century”.

Prof. Wroblewski is a former rector (principal) of the University of Warsaw. His fields of research are high-energy physics and the history of physics. He is the author of several books and his recent *Historia Fizyki* (“History of Physics”) topped the list of bestsellers on Merlin.pl (the Polish equivalent of Amazon). He holds three honorary degrees, including one from the University of Glasgow.

William Thomson – Lord Kelvin – was the dominating figure in science in the second half of the 19th century. He was buried in Westminster Abbey next to Isaac Newton, where a nave window pays tribute to him as “Engineer. Natural Philosopher”.

Yet in 1999 he did not make it into the top 10 physicists of all time in two independent surveys, which were dominated by 20th-century physicists and included only Newton, Galileo and Maxwell from earlier times.

So what did this man achieve, he who at age 10 was Glasgow University's youngest-ever student, at age 75 was its oldest, and during his 53 years as professor there was knighted and ennobled and made a fortune, most notably from intercontinental submarine telegraph cables and the compass for iron ships?

Thomson was born in Belfast in 1824. His father became professor of mathematics in Glasgow and at 10 years old William matriculated at the university there. He read Fourier's neglected *Theory of Heat* at 16 years old before going to study at Cambridge. In 1846 he worked in Regnault's lab in Paris before moving back to Glasgow to become professor of natural philosophy at the university. In 1848 he established the absolute scale of temperature that now bears his



The £100 note issued by the Clydesdale Bank for the anniversary.

name and in 1849 he reanalysed Carnot's heat engine.

Kelvin was seized by Fourier's book. He showed that heat flow could be analysed by integral calculus and a huge range of useful predictions made without knowing what heat actually is. This opened up the whole subject of the properties of continuous media to calculation and underpinned the later development of electromagnetic theory by Maxwell.

Kelvin was a key player in the establishment of the law of conservation of energy and the first and second laws of thermodynamics (as he named the subject in 1851). These are epic ideas so embedded in the whole of science and engineering that we tend to take them for granted.

Heat is work and work is heat

They have been stated in popular form in many ways – from the Flanders and Swann song (“Heat is work and work is heat, and, heat won't flow from a colder to a hotter, you can try it if you like but you'd far better not to”) to “You can't win, and you can't even break even.” Modern science lives from these principles and perpetual motion machines are thus banished to the realms of fantasy.

Kelvin introduced along the way words like “potential” and “kinetic” – things that every school child learns today.

Between 1858 and 1866 he laid the first transatlantic telegraph cable. This was a challenge and an adventure, pushing forward the limits of technology. With packet switched digital encoding

this preceded the internet by 140 years and shrank the world as never before. On the way he invented such necessities as a device for measuring the (unknown) depth of the ocean and the first inkjet printer (for recording the signals with minimal power demands.)

Kelvin entered the controversy in evolution and geology on the ages of the Sun and the Earth. He introduced correct logic for the first time, looking at all known sources of energy supply for the Sun and the progressive cooling of the Earth to arrive at a figure of around 25 million years, which alarmed Darwinists because it allowed insufficient time for evolution. But he pointed out that new energy sources would extend this. These were discovered much later – nuclear fusion for the Sun and radioactive decay for the Earth.

Kelvin had many students. Gerhard Phillips came from Eindhoven to learn how to make light bulbs (Kelvin's house was the first on Earth to be fully lit by electricity). Smoluchowsky came from Poland; Tanakadate from Japan. The latter was the father of Japanese geosciences (a crucial study in a land of earthquakes), the first person to use Roman letters for Japanese words and the first Japanese person to own a typewriter.

Kelvin famously said that he was never content with a theory until he had a mechanical model of it, and Glasgow University's Hunterian Museum store is full of his models. This served him well for many years but failed when he was confronted by electromagnetism, and held

back the theory of electricity. Even after discovering the electron, J J Thomson (no relation) regarded the electrical theory of matter, which led to modern quantum mechanics, as inferior to Kelvin's “vortex atoms” theory. Kelvin declared in 1896 that he had failed to overcome Fourier's threshold. He could account mathematically for many things but had not broken the barrier into, for example, the nature of the chemical bond. In the last decade of his life, new phenomena broke into his world – the electron, X-rays, radioactivity. This was a task for a new generation.

Thomson was the first scientist to be made a lord. His life was characterised by boundless energy – enough to keep a whole laboratory of assistants jumping, to write 661 scientific papers and to establish 75 patents. A modern equivalent might be Richard Feynman. Both were brilliant mathematical physicists and problem solvers. Both made major contributions to many areas of physics, had a wide interest in other areas and were inspirational teachers.

If we are to look for one thing to remember him by, scientists might pick the absolute scale of temperature as Kelvin's crowning achievement. Members of the public might opt for the telegraph cable across the ocean. To quote Alexander Russell (1912, five years after Kelvin's death on 17 December 1907): “His work lives and will continue to live. To him it has been given to make history which will live so long as intelligent man survives on this Earth. As the years roll on, our indebtedness to him increases.” These words are not inappropriate for the scale of Kelvin's achievements.

There are a number of centenary events planned throughout the rest of the year. For further details, see the calendar of events in this newsletter or on the website at physics.gla.ac.uk/misc/KelvinCentenary2007/index.html.

David Saxon

Scottish physicists get awards in recognition of their contributions

Congratulations go to a number of Scottish physicists who have achieved remarkable things.

Tom Balanowski

First to Tom Balanowski, a physics teacher from Linlithgow Academy and an IOP teacher network coordinator, who becomes an OBE for services to education in West Lothian.

Michael Cates and John Peacock

The Institute also congratulates two new fellows of the Royal Society, both of whom are physicists working in Scotland: Prof. Michael Elmhirst Cates and Prof. John Andrew Peacock. On 17 May, 44 new fellows and eight foreign members were elected from the fields of science, engineering and technology. Fellows are elected for their contributions to science, both in fundamental research resulting in greater understanding, and in leading and directing scientific and technological progress in industry and research establishments.

Prof. Michael Cates is professor of natural philosophy in the School of Physics at the University of Edinburgh. He is renowned for his theories of surfactant aggregates, polymers, colloids and other soft materials. His work has given new insight into the flow and aging of emulsions, foams and other “soft glassy materials”. He has made important advances in simulation methods to study fluid demixing and has developed new methods to predict the yielding and flow of colloids, and to address the physics of jamming.

Prof. John Peacock is professor of cosmology at the Institute for Astronomy at the University of Edinburgh. He is recognised for his significant contributions to our understanding of the cosmic evolution of extragalactic radio sources, the role of gravitational lensing in mapping dark matter



Holly Batchelor in front of her Cosmic Rain project in Albuquerque.

and the large-scale distribution of galaxies. He has also been influential in inspiring young researchers in cosmology.

Carol Trager-Cowan

Dr Carol Trager-Cowan is a physicist who has inspired thousands of people to take an interest in science and technology. She has been named Strathclyde of the Year by the University of Strathclyde.

Senior lecturer Dr Trager-Cowan received the honour for her dedication to bringing science out of the labs and into the street to engage school pupils and the general public.

Her outreach projects include uncovering Glasgow’s scientific heritage on tours of the city; helping kids to get to grips with physics by enabling them to create indoor lighting, rainbows and silicon chips; and giving and organising talks on science.

Her research includes the study of nitride semiconductors,

from which blue, green and white LEDs, and blue laser diodes are manufactured.

Prof. Andrew Hamnett, principal of the university, said: “Carol is strongly committed to public engagement activities and it is hard to overstate the importance of this side of her work. She embodies useful learning, making often complex concepts understandable to young people, which will undoubtedly have a positive impact on the future of science education and research.”

Dr Trager-Cowan is heavily involved with a number of influential science groups and projects, including the SQA Physics Subject Advisory Group; the Institute of Physics; the Glasgow Science, Technology, Engineering and Maths (STEM) Partnership Committee; the Glasgow and West of Scotland Branch of the British Association; and the Science Circus project.

Holly Batchelor

We are extremely pleased to announce that Holly Batchelor, 18, from the Mary Erskine School, Edinburgh, has scooped three prizes at the prestigious Intel International Science and Engineering Fair (ISEF), held last week in Albuquerque, US.

Holly’s project investigating cosmic rays – high-energy particles that travel close to the speed of light – received much interest throughout the week at ISEF and can be seen on YouTube (www1.the-ba.net/yp/sciencefairvideo.asp). It won her the following three prizes:

- first award in the physics and astronomy category (\$3000);
- an Agilent Technologies paid summer internship;
- a certificate of honourable merit from the American Association of Physics Teachers and the American Physical Society.

This was a fine achievement, especially considering that physics and astronomy was the second most popular category, with 117 projects in total and only 32 of these being carried out by girls. We are very proud of Holly and delighted that her CREST project allowed her to be part of such an exciting international event.

Two UK students also won three awards between them in the engineering categories, including a first award in the electrical and mechanical engineering category. Congratulations to former CREST gold winner Andrew Nowell and to David Badger for their successes in these categories. More information is available from Young Engineers on these engineering achievements.

These awards illustrate the strength and potential of young people in the UK in both science and engineering and give us all a further incentive to work together to create a high-profile national celebration for these talented young people.

Roland Jackson

Lab in a lorry reaches parts other labs can't

In April, Lab in a Lorry teamed up with science and technology company QinetiQ to deliver a tour in and around their sites in Fife, the Isle of Skye (Eilean a' Cheò) and the Western Isles (Eilean Siar), with more than 1400 children visiting the lab.

Lab in a Lorry is a hands-on working lab, staffed by practising physicists and engineers, with the aim of enthusing the next generation of physicists. It's aimed at 11–14-year-olds and is a partnership between the Institute of Physics, the Schlumberger Foundation and the Offshore Training Foundation.

As one of the largest employers of physicists in the UK, QinetiQ was well placed to provide volunteers, particularly for these remote places.

Volunteers for the Fife tour came from QinetiQ's Rosyth site and were involved in the visits to Queen Anne High School, St Columbas RC High School, Inverkeithing High School, Dunfermline High School and Woodmill High School. These visits were given an additional boost when local MP for Dunfermline, Willie Rennie, came to see the lab in action.

The lorry then went west to Plockton High School near the Isle of Skye. This visit was staffed by volunteers from QinetiQ's BUTEC site at the Kyle of Lochalsh.

After quickly packing up, the lab arrived in Uig just in time to catch the ferry to Lochmaddy in North Uist. From there it visited Sgoil Paible, North Uist, Sgoil Daliburgh, South Uist and Sgoil Lionacleite, Benbecula. All of the volunteers came from QinetiQ's range site in Benbecula, some of whom communicated their science to the children in Gaelic.

After the Western Isles tour, the lab went back on the ferry and got to the mainland in time for a two-day visit to Portree High School, again using



Top: Lab in a Lorry boarding the Skye ferry. Bottom: Fife pupils doing experiments on impact testing (left) and resonance (right).

volunteers from QinetiQ's site at the Kyle of Lochalsh. The lab then went east back to Fife, stopping at Kirkcaldy High School and finishing off at Beith High School, Cowdenbeath. Again, volunteers came from QinetiQ's Rosyth site.

By the end of this tour, Lab in a Lorry had had more than 1400 children visit, many coming from some of the most remote areas of Scotland.

Ian Cuthbert, programme manager for Lab in a Lorry, said: "This recent tour of Scotland has shown Lab in a Lorry at its best. Having mobility has given us the opportunity to reach the unreachable by sending the lab to the Western Isles of Scotland. In conjunction with QinetiQ we delivered quite possibly the best tour yet, with hundreds of children taking part. The children, and the islanders in general, really appreciated us going all that way. Interestingly there was also a mobile cinema when we were there, so clearly mobile units are having an

impact on the islands. It is the remote communities that benefit most from these projects."

Murdo Macdonald, project manager at QinetiQ, said: "We are all really enthusiastic about promoting science and technology and delighted that the lab toured Scotland. Our volunteers on the lab were all scientists or engineers who work at our Scottish sites and they were all very excited about taking science into the community."

Lab in a Lorry now has funding to operate one lab in Scotland and will be touring the country for the rest of the year. In addition to the dates listed here, the lab is planning a west coast tour in and around Glasgow for the whole of October and a tour of Edinburgh, Lothian and Borders for the whole of November.

Further information about the Lab in a Lorry project is available from the website atlabinlorry.org.uk.

Ian Cuthbert ian.cuthbert@iop.org

LAB IN A LORRY NEEDS YOU

Are you interested in communicating science to young people? Why not volunteer for Lab in a Lorry? We have plenty of events in Scotland, many of which will be in your area. Many of our previous volunteers surprised themselves by how good they are with children.

Full training will be provided and you can either stick to the one experiment for the day or try out the others. The three experiments we currently have are on resonance, viscosity and surface tensions, and scattering.

If you're interested in becoming a volunteer, contact Ian Cuthbert (e-mail ian.cuthbert@iop.org).

Lab in a Lorry dates for 2007

- 22 August**
Perth Grammar School, Perthshire
- 23–24 August**
Kinross High School, Perthshire
- 27 August**
Kingussie High School, Perthshire
- 30–31 August**
Grantown Grammar School, Granton-on-Spey
- 3–4 September**
Meldrum Academy, Oldmeldrum, Aberdeenshire
- 5 September**
Alford Academy, Aberdeenshire
- 6 September**
Westhill Academy, Aberdeenshire
- 10 September**
Harlaw Academy, Aberdeen
- 11–12 September**
Portlethen Academy, Aberdeenshire
- 13 September**
Carnoustie High School, Angus
- 17–18 September**
Monifieth High School, Monifieth, Angus
- 19 September**
Braevue Academy, Dundee
- 20 September**
High School of Dundee
- 24–25 September**
Thurso High School, Caithness
- 27–28 September**
Wick High School, Caithness

Visitors from outer space attend space school



Every year the Careers Scotland Scottish Space School holds a Science and Enterprise Festival in June. During a fortnight a number of NASA personnel visit and tour Scotland. The NASA guests, including a number of astronauts, attend a variety of events, such as the residential summer school, teacher CPD

sleepover and the Tomorrow's Inventors final. They also visit in excess of 20 000 pupils in their schools around Scotland.

The Careers Scotland focus is on the formal education system. However, there is tremendous interest in aeronautics and space science among the general public. As a result, two

astronauts talked to a packed IMAX theatre at Glasgow Science Centre. They told us about their inspiring journey in the shuttle to the International Space Station in 2006 and also talked about the training involved before reaching that point. The astronauts answered questions at the end and were

very open and humorous in their replies. The feedback was "out of this world" being described as educational, inspirational, motivating and enjoyable.

The event was a joint venture between IOP Scotland, Careers Scotland and the Glasgow Science Centre.

Alison McLure

If you want to contribute an article to the next issue of this newsletter

e-mail alison.mclure@iop.org

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CALENDAR OF EVENTS SEPTEMBER 2007 – JANUARY 2008

An up-to-date listing of Institute of Physics in Scotland meetings can be obtained by searching on Scotland at whatson.iop.org

Monday 17 September 2007

Schools' Lecture Series Light Fantastic: the Science of Colour

St Andrews University
10.00 a.m.
Talk by Dr Pete Vukusic, School of Physics, Exeter University.
Contact Lesley Aitken (tel 01334 463100; e-mail physics@st-andrews.ac.uk).

Tuesday 18 September 2007

Schools' Lecture Series Light Fantastic: the Science of Colour

Aberdeen
Talk by Dr Pete Vukusic, School of Physics, Exeter University.
Contact Alistair Flett (tel 01651 891620; e-mail amflett@hotmail.com).

Wednesday 19 September 2007

Schools' Lecture Series Light Fantastic: the Science of Colour

Heriot-Watt University
Talk by Dr Pete Vukusic, School of Physics, Exeter University.
10.00 a.m. and 2.00 p.m.
Contact Derryck Reid (tel 0131 4513652; e-mail d.t.reid@hw.ac.uk).

Thursday 20 September 2007

Schools' Lecture Series Light Fantastic: the Science of Colour

Glasgow University
Talk by Dr Pete Vukusic, School of Physics, Exeter University.
11.30 a.m. and 1.30 p.m.
Contact Lucy Murray (tel 0141 3304707; e-mail l.murray@physics.gla.ac.uk).

Tuesday 2 October 2007

Light for the Firm but Gentle Control of Disease

Glasgow Science Centre
7.00p.m.
Talk by Prof. Stephen Bown, director of the National Medical Laser Centre at the Royal Free and professor at University College London Medical School on medical imaging.

As medical imaging evolves, it becomes easier to understand the nature and extent of localised diseases in the human

body – and to treat them. Laser light can get almost anywhere using thin fibres passed through flexible telescopes or even just down needles. It can be used to destroy abnormal tissue in many sites. Above all, with no open surgery and safe healing, it's a simple and gentle approach for treating an increasing range of conditions.

Tuesday 6 November 2007

Pie in the Sky – Scotland's Space Satellites

Glasgow Science Centre
7.00 p.m.
Talk by Dr Craig Clark of Clyde Space in Glasgow on space as the final frontier. Is it too far a frontier for Scotland to have any input into? Your average Scot might think so, but a change of mindset to “can do” would be enough to make space innovation and exploration part of Scotland's proud heritage of engineering achievement.

In fact, a small company in Glasgow has already started down the road of defying the doubters. Clyde Space plans to have launched Scotland's first satellite within two years.

This first mission will fly a scientific payload, ScotSat-1, from one of Scotland's universities. It will bring together the efforts of students and academics from Strathclyde and Glasgow universities, in addition to an outreach programme to get 5th- and 6th-year secondary-school students involved in the design, build and launch of the satellite.

There are many compelling reasons for humanity to explore and exploit space. It is hoped that ScotSat-1 will stimulate interest in the science and technology that go into a space mission, leading to a higher take-up of technology subjects in schools and universities. Clark will discuss the challenges of designing and launching a satellite and the plans for Scotland's first homegrown space adventure.

Wednesday 14 November 2007

Kelvin 2007 Conference

Kelvin Gallery, Glasgow University
Chaired by Prof. David Saxon, current holder of the Kelvin

Chair. Programme details are available online (www.iop.org/Conferences/Forthcoming_Institute_Conferences/KEL07/event_9067.html). To register interest, contact Claire Garland (tel 020 7470 4800; e-mail claire.garland@iop.org).

Thursday 15 November 2007

History of Physics Conference

Glasgow University
Organised by Denis Weaire. Sponsored by the Institute of Physics and the European Physical Society.

Tuesday 20 November 2007

Forests and Physics

Glasgow Science Centre
7.00 p.m.
Talk by Dr Ronnie Milne from the Centre for Ecology and Hydrology, Edinburgh. He will explain how physics can help us to understand the fascinating and intricate world of the forest ecosystem.

Dr Milne will look at methods for describing how water moves from the soil through tree trunks and out to the atmosphere. Basic ideas from mechanics can be used to describe the bending of trees in the wind. He will also look at how the carbon dioxide that is absorbed by trees from the atmosphere is important in predicting climate change – something that is becoming ever more important in today's carbon-conscious world.

Thursday 6 December 2007

Joint IOP Scotland/IMEchE seminar – 3D Visualisation

House for an Art Lover, Glasgow

Tuesday 11 December 2007

Unravelling the Secrets of the Brain

Glasgow Science Centre
7.00 p.m.
Talk by Dr David Donaldson from the University of Stirling about memory. How can you remember your past so vividly that it is almost as if you are reliving the experience? Despite the fact that remembering is fundamental to human experience and critical for normal life, how it works remains one of the unexplained mysteries of the human mind.

One important step towards understanding memory lies in clearly distinguishing between

different types of memory, and identifying the neural mechanisms that support the experience of remembering.

To try to divide memory into its constituent parts, and to understand the way in which the brain supports memory, we can use brain-imaging methods. These probe the pattern of brain activity while people perform memory tasks. Neuro-imaging techniques (functional magnetic resonance imaging and event-related potentials) can be used to identify a network of brain regions in the frontal and parietal cortices that are active when people remember events from the past. This talk explores where this fascinating subject might take our understanding of our own minds.

Monday 17 December 2007

Schools' Lecture Series Lord Kelvin

Edinburgh University
Lecture by Johnny Ball.
Sponsored by the Royal Society of Edinburgh and IOP Scotland.

Tuesday 18 December 2007

Schools' Lecture Series Lord Kelvin

Glasgow University
Lecture by Johnny Ball.
Sponsored by the University of Glasgow and IOP Scotland.

Thursday 17 January 2008

Joint IOP Scotland/IMEchE Seminar – Is Renewable Energy Really Sustainable?

Glasgow Caledonian University
Talk by Ian Arbon.

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